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in his circular dated October 16, 1888, prohibited the use of benzoic acid in drinks and food.

In Austria the Supreme Sanitary Council in an expert opinion dated December 16, 1899, decided in favor of a prohibition of preserving substance containing benzoic acid or its salts, and has adhered to this standpoint in a recent expert opinion and given a detailed justification of the same. In the same sense the Saxon Landes-Medizinal-Kollegium expresses itself.

The Scientific Deputation for Medical Affairs is likewise of the opinion that the use of benzoic acid and benzoic acid salts for the preservation of food should not be permitted. Even if small doses of the same may be considered harmless for the human organism there is still a danger that, with the addition of these substances to the various food and drinks on the whole quantities would be daily consumed, which would be injurious to the organism. This fear is particularly justified in the case of children, the aged, and weak or sick persons, whereby it is to be observed that even in the case of normal food not preserved with benzoic acid substances are introduced from which benzoic acid comes into existence in the body.

A further objection against the use of chemical preservatives at all consists in the fact that in its use the food intended for consumption may not be handled with the necessary care and cleanliness to prevent its decay or injury by fungi and that, being neglected by the manufacturers and sellers, under certain circumstances the quality of the goods would suffer. . . .

Similar objections exist regarding albuminous food liable to decay. The experiments of the imperial health office have demonstrated among other things that a slight smell of decay in chopped meat may be concealed, but not entirely removed, by merely stirring or turning over the meat; but on mixing with 0.25 per cent. benzoic acid or sodium benzoate the smell disappears for a time. By this process, therefore, food which has already commenced to decay can be given the appearance of freshness and the purchaser deceived as to its quality.

These findings agree exactly not only with the opinion officially expressed by the American Medical Association in its resolutions on this subject, but also with the opinion held by other scientific bodies and by the intelligent public generally. With the reorganization of the Department of Agriculture, which is as inevitable as it is necessary, it is to be hoped

that the United States government will soon cease to hold its present inconsistent position on the subject of the use of sodium benzoate in foods. This chemical has no place in the dietary of any people and certainly its legalized use is a disgrace to an enlightened nation.—*Journal of the American Medical Association.*

SCIENTIFIC BOOKS

Memorial Volume Commemorative of the Life and Work of Charles Benjamin Dudley, Ph.D., Late President of the International Association for Testing Materials and of the American Society for Testing Materials. Published by the American Society for Testing Materials, Philadelphia, Pa. 1911.

The book is, in fact, the proceedings of a memorial session held by the American Society for Testing Materials on June 29, 1910. The proceedings began with the presentation of a sonnet in memory of Charles Benjamin Dudley by Harvey W. Wiley and closed with a personal tribute by Robert W. Hunt. Other contributions to the proceedings consisted of discussions of several phases of Dr. Dudley's character, his life, and his work, by the different officers and members of the association, respectively, as follows: Introduction, by Vice-president Robert W. Lesley; Dr. Dudley as a Railroad Man, by Theodore N. Ely; Dr. Dudley as a Chemist, by Edgar F. Smith; Dr. Dudley as a Metallurgist, by Henry M. Howe; Dr. Dudley as a Mentor, by B. W. Dunn; Dr. Dudley as a Citizen, by W. H. Schwartz. These discussions were followed by minutes and announcements on the death of Dr. Dudley and copies of various papers and addresses by him.

The discussions of the phases of his character and life were all highly eulogistic, as might be expected, but everything said was fully justified. His life and character were worthy to be studied and copied by all, and particularly to be studied and used as an example and inspiration for young men. Mr. Lesley well summed up his character when he said, "he was a diplomat of the heart, a nobleman of nature's handiwork . . ." and further

he said most justly, "he was a kind and generous friend to the young men and particularly solicitous for their advancement."

These were the qualities which made Dr. Dudley so successful as president of the American Chemical Society. In that high office his kindly diplomacy and great tact enabled him to harmonize many conflicting interests, and to so largely help to advance the interests of the society and bring it to that excellent condition of harmony and efficiency which now prevails.

This book will be a valuable addition to all libraries and particularly to those of the younger generation. It should be read and pondered by all men.

WILLIAM McMURTRIE

Taschenbuch für Mathematiker und Physiker.

By FELIX AUERBACH and RUDOLF ROTH. Leipzig, B. G. Teubner. 2 Jahrgang, 1911.

The second volume of the "Taschenbuch" consisting of 580 pages, may not correspond to the American idea of a "Taschenbuch," but it is an unusually convenient "Handbuch" for mathematicians and physicists. A part of the table of contents is of value only or chiefly to residents of Germany—the calendar for Berlin, the table of magnetic elements for central Europe, the "Verzeichnis der Hochschullehrer"—but with these exceptions the entire book is of general interest. The articles dealing with astronomical facts concerning planets and comets, the tables of astronomical and geodetic constants, the four-place logarithm tables of numbers and trigonometric functions, the tables of squares and Bessel functions, the numerous tables of all the important physical constants, call for no review. One notes, however, how admirable is the synopsis of the fundamental definition and operations of mathematics. A candidate for a doctor's degree in physics would do well to master the mathematical portion of this volume. Not only is here given the theoretical groundwork of the subject, there are also given labor-saving applications; *e. g.*, the complete Fourier's series are worked out for a number of common

forms of the function. There is also an application to life-insurance mathematics.

The synopsis of the fundamental principles of physics, while lacking the continuity of the mathematical synopsis, is none the less complete. There is here condensed what one ordinarily finds spread over several volumes of general physics.

The article which will be of the greatest interest to readers of the "Taschenbuch" is that on the principle of relativity by Willy Wien. It is an historical and a critical summary, complete at least in its physical aspect. The contributions to this theory made by Minkowski are briefly set forth not only in this article but also in the review of Minkowski's work with which the book opens. That one who has contributed so much to this far-reaching theory should be cut off in the very prime of his power is to be greatly deplored. Physicists and mathematicians will be pleased to have the portrait of Minkowski which accompanies the article. G. F. HULL

SPECIAL ARTICLES

CONCERNING A NEW ARRANGEMENT OF THE ELEMENTS ON A HELIX, AND THE RELATIONSHIPS WHICH MAY BE USEFULLY EXPRESSED THEREON

In this abstract of a paper which, under the title "Helix Chemica," has been published in *The American Chemical Journal*, Vol. XLV., p. 160, 1911, the writer wishes to explain briefly the grounds of the proposed arrangement and to illustrate by a few examples the many uses to which the helix may be put to bring out and compare the complex relationships of the elements.

In Fig. 1 the helix is presented from the side, in Fig. 2 from the end, where of course the front curve of each series hides those behind it. In Figs. 3-6 the curves are drawn as if they were on the end of a barrel, enabling one to see the groups and series at the same time. A great number of harmonic relations are presented on these figures, only a few of which can be discussed in this abstract. The system uses the series of Mendeléeff, but makes one half of each group the antithesis,